

Original

4 June 1985

MEMORANDUM FOR: FBIS/Contracting Officer  
FROM: Chief, FBIS Engineering Division  
SUBJECT: Sole Source Justification

1. COMSAT International Communications Inc. presently has the contract to act as FBIS' agent in the procurement of a transponder lease with the INTELSAT Board of Governors. They also have been charged with negotiating, as FBIS' agent, with the British Telecom Inc. (BTI) and the Panamanian PTT for the construction of ground stations to support the FBIS INTERNET system. COMSAT is the prime contractor for FBIS to ensure a total end-to-end system and therefore must liaison closely with all parties involved with the entire system. If COMSAT is awarded the U.S. ground station construction/installation contract, a savings to the U.S. Government would be realized as a layer of liaison with another Common Carrier would not be necessary. Otherwise, a change of scope would have to be written into the present contract for COMSAT to act as liaison with the Common Carrier, the FCC, INTELSAT, and the foreign PTTs. FBIS is working under a tight time frame and by awarding this contract to COMSAT a considerable time savings would also be realized as they, COMSAT, would be the sole agent and supplier to the INTERNET system making a tighter control of scheduling easier.

2. Based on the above facts, it is requested that COMSAT International Communications Inc. be awarded the contract to construct the ground station, operations building, and procure and install all associated equipment necessary in the U.S. portion of the INTERNET system.

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Distribution:

- 1 - Addressee
- 1 - Contract File
- 1 - Chrono

RFP INTERNET TERMINAL/GROUND STATION

The Foreign Broadcast Information Service (FBIS) has a requirement to construct an INTELSAT qualified earth station in Northern Virginia. This document describes the details of the solicitation in terms of equipment, schedule, and services being required. It is expected that the contractor will provide a total turn key effort excepting the land which will be provided by FBIS.

The site is located on the Quantico Marine Base near Camp Goetige, an abandoned marine encampment. The site has one existing building (not considered part of the proposed site) and is surrounded by heavily wooded areas. Power and telephone service is available near the site. The latitude is N38-34-18 and the longitude is W77-33-40.

The contractor shall provide all the necessary civil works, power interface, frequency coordination and FCC licensing, installation, and qualification to bring on line an earth station conforming to INTELSAT BG-28-74E (Rev. 1) dated 15 December 1982 specifications. Account should be taken, and reflected in the proposed system design, that this station will not, repeat not, transmit or receive frequency division multiplex carriers or INTELSAT standard SCPC carriers.

The site is expected to work with satellites in the arc from 18.5° west to 53° west, and utilize a full transponder on a global beam.

Signal interface will be at an FBIS operations building to be constructed within 200-300 feet of the antenna complex. The operations

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building shall be so configured as to allow ample room to house all terminal equipment, an electronic repair shop, storage area, office, lunch room, and facilities for both sexes. A parking area and an access road should also be planned. Fencing of the entire site will be the responsibility of the contractor.

Preliminary study/design results are available for reference but do not relieve the bidders of the responsibility for establishing all aspects of the site design. Site surveys prior to proposal submission are encouraged. RFI measurements prior to the submission of bids will not be possible.

The schedule for the installation must result in a qualified earth station within 15 months ARO. It is anticipated that an incentive/penalty condition will be applied to the contract as far as completion is concerned.

SYSTEM TRAFFIC (MODULATORS DEMODULATORS) PARAMETERS

1 full motion analogue TV carrier with associated audio. The format will be any of the known TV standards e.g., NTSC, PAL, SECAM, etc.

1 order wire channel FM/SCPC

6 full duplex wideband FM/SCPC channels, e.g., high quality telephone voice grade circuits typically 15KHz bandwidth.

1 wideband, 300 KHz deviation, FM/SCPC channel

It is required that the earth terminal provide for expansion to 20

RFP INTERNET TERMINAL/GROUND STATION (Con't)

of the voice grade 15 KHz channels, two of the wideband, 300 KHz channels and two of the TV channels. Modulator/demodulator redundancy is required for the order wire, TV, and wideband channels as part of this procurement. The redundancy required is two.

DELIVERABLES

Complete project plan showing milestones and delivery dates

(two weeks ARO)

Monthly progress reports explaining progress against project schedule

Washington Area Earth Terminal with associated test and qualification reports

License for the Washington Earth Terminal.

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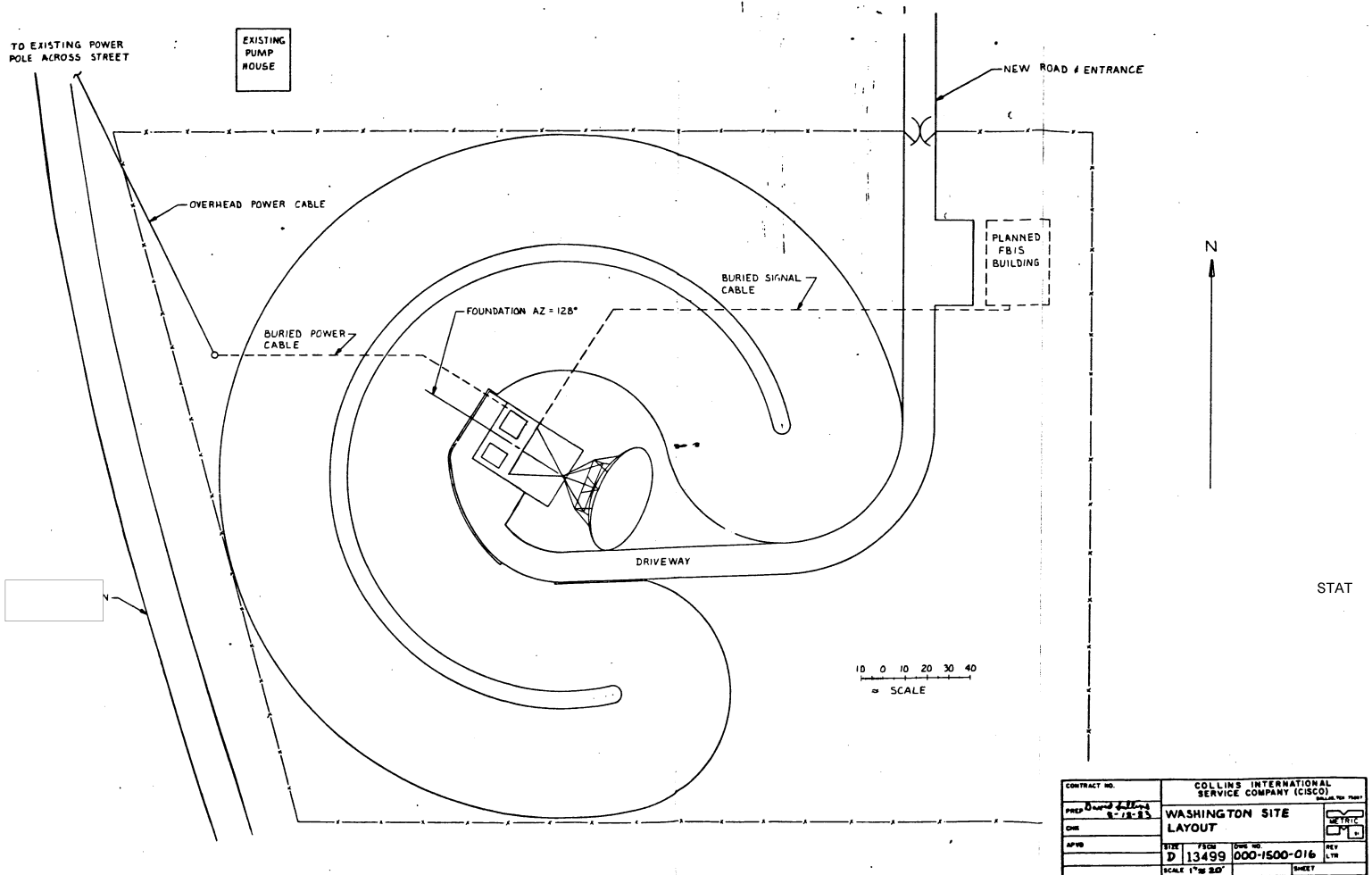
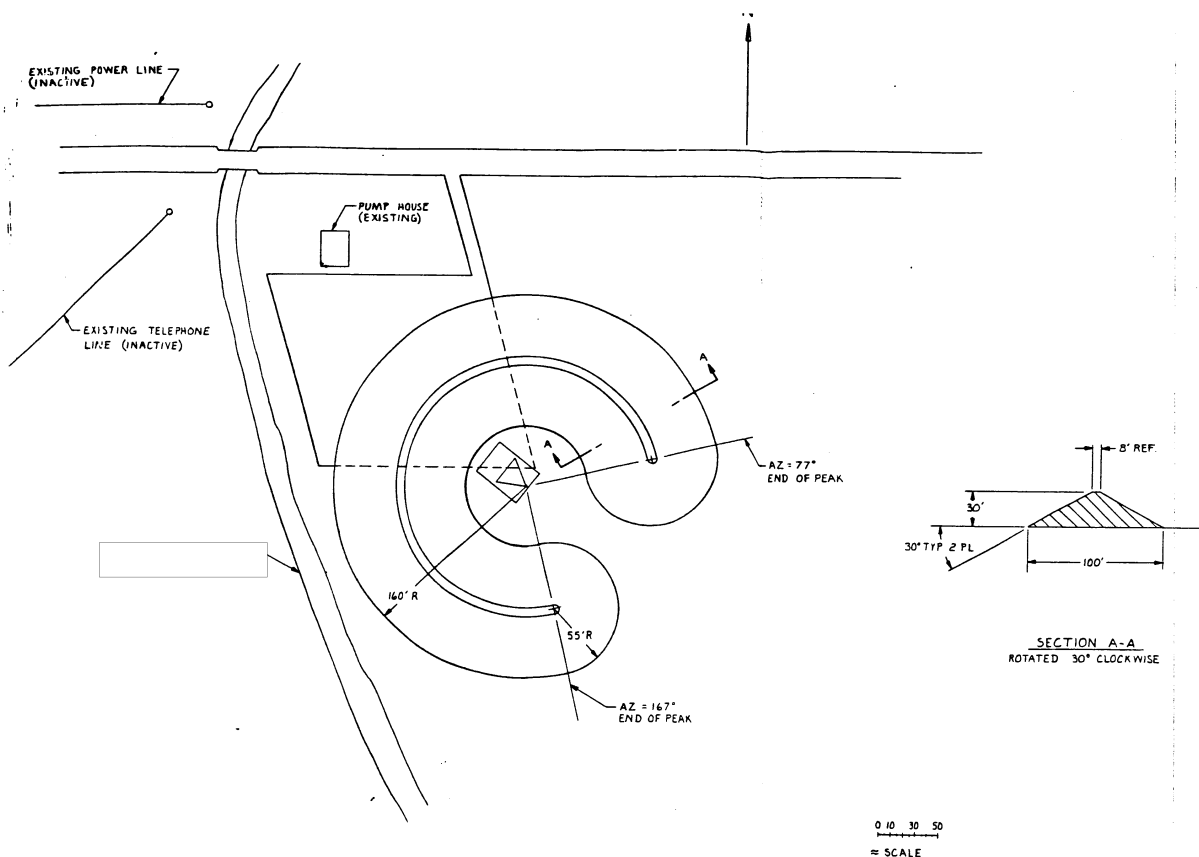


FIGURE 3.16-3 648-9905-000 Page 3-190



CONTRACT NO.	COLLINS INTERNATIONAL SERVICE COMPANY (CISCO)			
PREP	WASHINGTON			
CHK	CONSTRUCTION LAYOUT			
APVD	DATE	FROM	DATE NO.	REV
	D 13499		000-1500-031	1
SCALE 1" = 40'				SHEET

FIGURE 3.16-2 PAGE 3-189

SITE REPORT - Washington, D.C.**3.17 FREQUENCY COORDINATION SITE REPORT - Washington, D.C.**

First level frequency coordination analysis was performed for three sites north of Washington in Virginia and Maryland at U.S. government owned facilities. Based on the high RFI level computed, these sites were rejected. A set of RFI intensity contour maps for the vicinity of Washington was prepared and based on these, the areas of Ft. Belvoir and Quantico Marine Base in Virginia, south and southeast of Washington, were considered to be promising. Spot RFI measurements at five different sites in the vicinity of [REDACTED], STAT on the western edge of Quantico, were conducted and confirmed these were relatively quiet locations, because of the shielding provided by the tall evergreen trees. A more complete set of RFI measurements was made at the upper part of Camp Goettge. Only 4-GHz signals were detected. Spot check measurements were also made at the nearby nearby pump station on Dorrel's Run (Creek) which is about 60-feet lower than Camp Goettge. These measurements indicate that it has a 7 dB advantage. It is the preferred site from an RFI viewpoint. An earth berm with tall trees on top is recommended to shield the site from nearby microwave sources.

**3.17.1 Pre-Survey**

In the December 1982 - January 1983 time frame first level frequency coordination computer analysis by COMSEARCH, INC. were performed for the following sites:

<u>Location</u>	<u>North Latitude</u>	<u>West Longitude</u>	<u>AMSL</u>
Tantallon, Maryland	38° 44' 09"	77° 00' 40"	80 ft.
Gaithersburg, Maryland	39° 06' 33"	77° 12' 26"	410 ft.
Great Falls, Virginia	38° 59' 43"	77° 18' 50"	380 ft.

The analyses indicated potentially numerous and very strong (up to 73.1 dB excess) RFI. Of the three, the Gaithersburg, Maryland site showed the lowest potential (up to 53.6 dB excess) RFI, but the



SITE REPORT - Washington, D.C.

terrain and local buildings offered no shielding so these sites were rejected. To aid in searching for suitable sites COMSEARCH, INC. was engaged to prepare RFI intensity maps at 4 and 6 GHz for the area around Washington, D.C. This led to concentrating on the northwestern edge of the Quantico Marine Base in Virginia. COMSEARCH, INC. was engaged in June 1983 to make spot check RFI measurements at five different locations. One of these sites was a cross roads which was so well shielded by trees that no RFI was detected, but which is not available as a site. From these measurements, two candidate sites were selected for further investigation:

<u>Location</u>	<u>North Latitude</u>	<u>West Longitude</u>	<u>AMSL</u>
	38° 34' 37"	77° 33' 29"	320 ft.
	38° 34' 18"	77° 33' 40"	255 ft.

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## 3.17.2 First Level Frequency Coordination

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The look angles to the Atlantic Ocean INTELSAT satellites from Washington, D.C. are as follows:

<u>SATELLITE LOCATION</u>	<u>LOOK ANGLE</u>	
	<u>LONGITUDE</u>	<u>AZIMUTH</u>
W 53		144.5
W 34.5		124.3
W 31		121.2
W 27.5		118.1
W 24.5		115.7
W 21.5		113.3
W 18.5		111.0
W 4		100.8
W 1		98.8
		38.2
		27.0
		24.6
		22.1
		19.9
		17.6
		15.4
		4.3
		2.0

SITE REPORT - Washington, D.C.**3.17.2 First-Level Frequency Coordination (Continued)**

It is planned for the earth station to only use satellites between 31 and 18.5 degrees west longitude.

Table 3.17.1 shows the CCIR recommended coordination distances for the site, excluding precipitation scatter, at 6 GHz assuming HPA transmitting level of 0 dBW/4 kHz.

A first-level frequency coordination computer analysis based on FCC microwave data base files, for the U.S.A. was performed by COMSEARCH to determine the microwave interference potentials for the transmit-receive earth station located at the Camp Goettge site. The initial interference analysis for the proposed transmit/receive earth station revealed 38 potential interference conflicts which did not meet interference-level objectives on a line-of-sight basis. These paths were printed out in Table 3.17-2. For these critical cases, terrain path profiles were prepared. This involved plotting the interference path on topographic maps - typically 7.5 minute series USGS maps - to determine the terrain characteristics of the path. When this was accomplished, predicted over-the-horizon (O-H) losses, where applicable, were calculated using the techniques of the National Bureau of Standards Technical Note 101, Revised. These calculations give the amount of signal attenuation resulting from terrain blockage.

Path profiling cleared 27 of the 38 conflicts as shown in Table 3.17-2.

Nine of the interference conflicts are in the 4-GHz receive band. A polar plot of these cases is shown in Figure 3.17-1. As shown in Table 3.17-2 and Figure 3.17-1, some of these areas are quite severe, exceeding the objectives by up to 47.7 dB. These are shown as cases 1, 8, 22, 41, 56, 71, 82, 113 and 135 in Table 3.17-2.

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TABLE NO. 3.17-1

6-GHZ COORDINATION DISTANCE (SINGLE PATH) FOR WASHINGTON, D.C.

LAT= N 39-06-33    LON= W 77-12-26    ZONE= A

AZIMUTH (deg)	COORD DIST (km)	AZIMUTH (deg)	COORD DIST (km)
0	184	180	184
5	184	185	184
10	184	190	184
15	184	195	184
20	184	200	184
25	184	205	184
30	184	210	184
35	184	215	184
40	184	220	184
45	184	225	184
50	184	230	184
55	184	235	184
60	184	240	184
65	184	245	184
70	190	250	184
75	198	255	184
80	206	260	184
85	215	265	184
90	225	270	184
95	235	275	184
100	245	280	184
105	254	285	184
110	259	290	184
115	257	295	184
120	249	300	184
125	239	305	184
130	229	310	184
135	219	315	184
140	209	320	184
145	201	325	184
150	193	330	184
155	186	335	184
160	184	340	184
165	184	345	184
170	184	350	184
175	184	355	184

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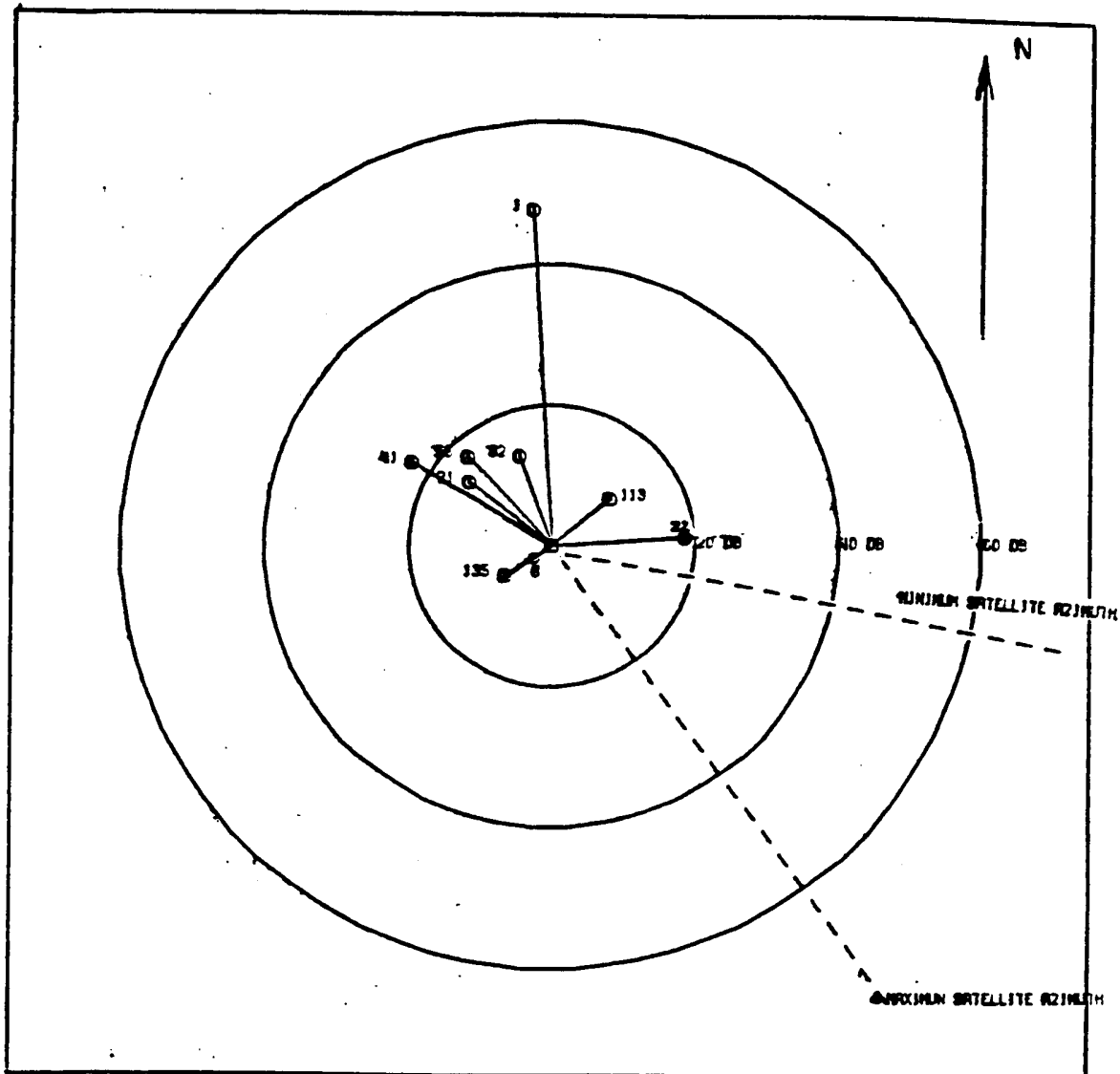
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TABLE 3.17-2 (Continued)

INTERFERENCE SUMMARY  
CAMP GOETTGE, VIRGINIA

	PATH ID	ENRQ	DIST (NM)	AS (DEG)	ES DISC (DEG)	ES GAIN (DBI)	ES LOS LOSS REQ'D (DB)	ON LOSS 200 (DB)	REVISD MARGIN 200 (DB)
62.	MILLSVILLE CANNON CITY	6L	76.8	52.8	46.3	-9.6	15.7	43.9	-28.2
63.	LEESBURG FARMALDIE	6H	58.2	1.3	101.0	-10.0	15.4	22.8	-7.4
66.	L. ENFANT FLISKILLING FLJ	6H	57.4	53.4	46.3	-9.6	15.4	51.3	-35.9
71.	WARRENTON 2 INDEP HILL	4A	30.3	307.1	137.8	-10.0	14.0	0.0	14.8 **
82.	BRIMMERT NOKESVILLE	4A	34.9	339.6	121.0	-10.0	13.6	0.0	13.6 **
84.	ANDERS AVE TONLEY	4B	63.9	65.5	36.4	-7.0	13.0	43.9	-30.9
85.	TONLEY ANDERS AFB	4A	58.7	44.9	56.2	-10.0	12.9	34.2	-21.3
90.	PAULAVAR CORBIN	4B	52.6	107.4	6.3	12.1	12.7	45.4	-32.7
92.	HILL RUN NOKESVILLE	6L	37.9	344.9	116.0	-10.0	12.4	0.0	12.4 **
113.	INDEP HILL QUANTICO	4B	12.9	51.0	51.3	-10.0	10.5	0.0	10.5 **
135.	NOKESVILLE NOKESVILLE	4A	19.9	237.2	91.0	-10.0	7.9	0.0	7.9 **

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Polar Plot Display of Interference Cases  
Figure 3.17-1

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Two unacceptable cases were computed for the 6-GHz band. These cases are shown in Table 3.17-2 as number 19 and 92 which potentially affect the lower half of the band. Since the INTELSAT V global beam transponders only operate in the 6175 MHz to 6425 MHz band, only the 6-GHz signals that are in the upper half of 6-GHz band are a concern. The interference criteria for the 6-GHz transmit spectrum utilized objective levels of -154 dBW/4 kHz and -131 dBW/4 kHz for 20% and 0.0025% of the time, respectively, as specified in the FCC rules. The transmit power level used by COMSEARCH in this analysis was -5 dBW/4 kHz. This level was later upgraded by Collins to 0 dBW/4 kHz, but does not change the number of unacceptable 6-GHz cases.

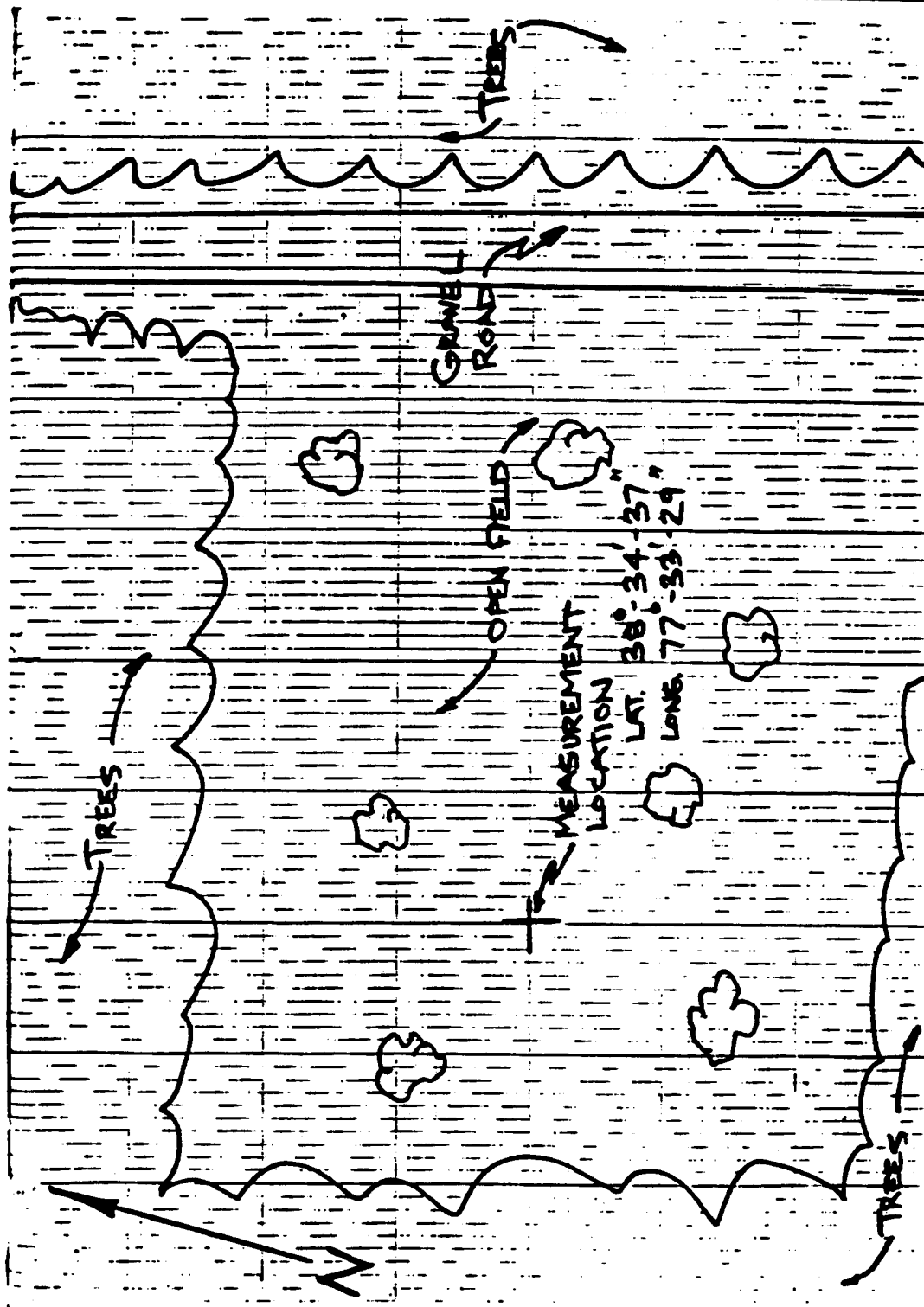
The predicted worst-case interference levels at 4 GHz as determined by the COMSEARCH analysis is shown in Table 3.17-2 based on an interfering criteria of -158 dBW into the LNA. This criteria is suitable for the high speed digital channels. The 4-GHz signal which is most susceptible to interference is the narrow band (25 kHz) FM/SCPC signal because it receives the least power from the satellite. The interference criteria goal for a single interferer for SCPC is to not exceed -180 dBW in 25 kHz at the LNA input of a 15.5-m antenna 0.01 percent of the time. From Table 3.17-2 this would make the worst case additional attenuation required to be 70 dB to clear the band for SCPC.

### 3.17.3 Site RFI Survey

On-site RFI measurements were conducted on 6 and 7 July 1983 at Camp Goettge. Previously, spot check measurements had been made at this site. Also on July 6, 1983 spot check measurements were made at the nearby Water Pump Station which is south of the Camp proper on Dorrel's Run Creek.

Plot plans for these sites are given in Figures 3.17-2 and 3.17-3. The horizon profiles for the two sites are given in Figures 3.17-4 and 3.17-5.

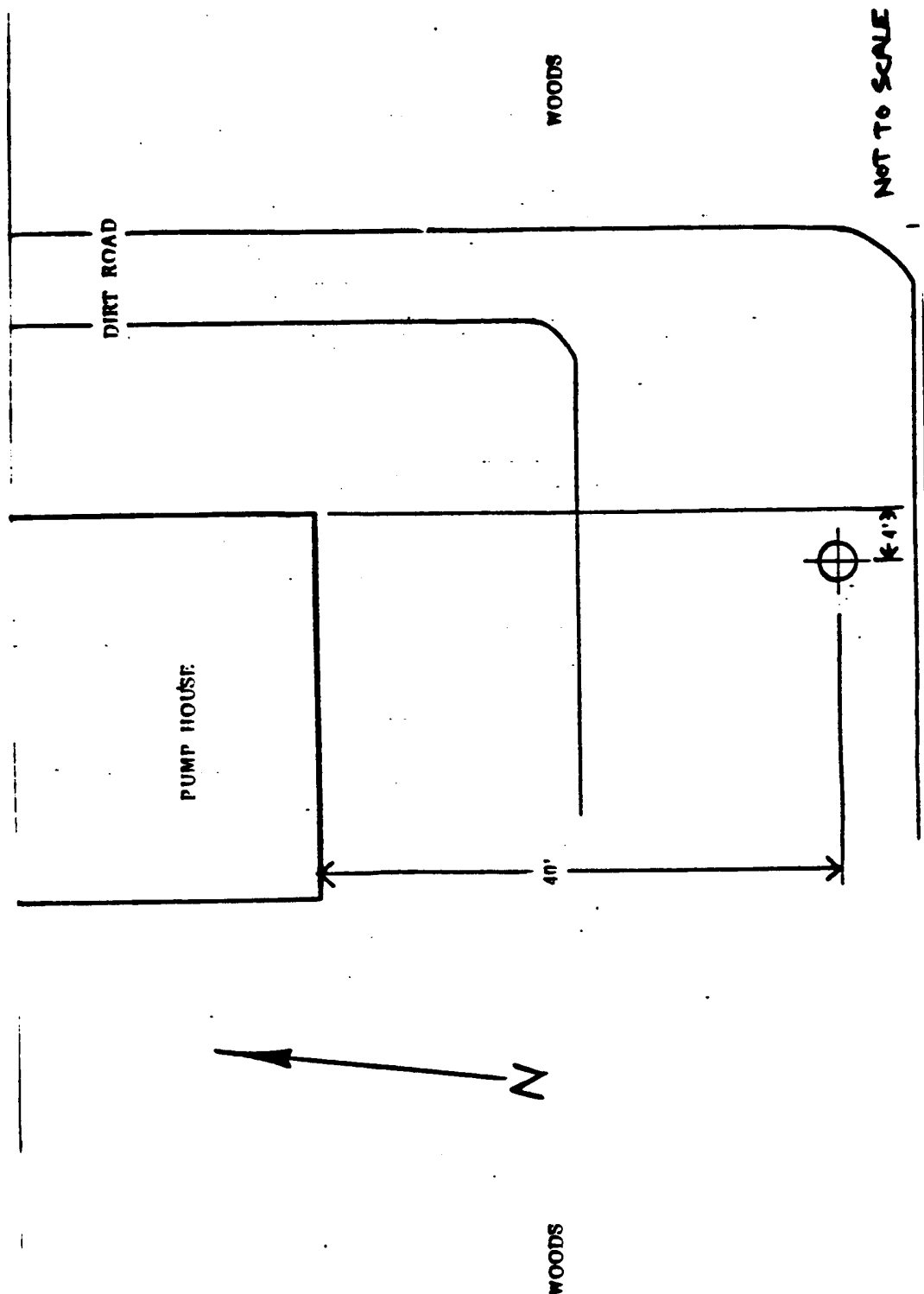
SITE REPORT - Washington, D.C.



Plot Plan for Measurement Site at Upper Camp Goettge  
Figure 3.17-2

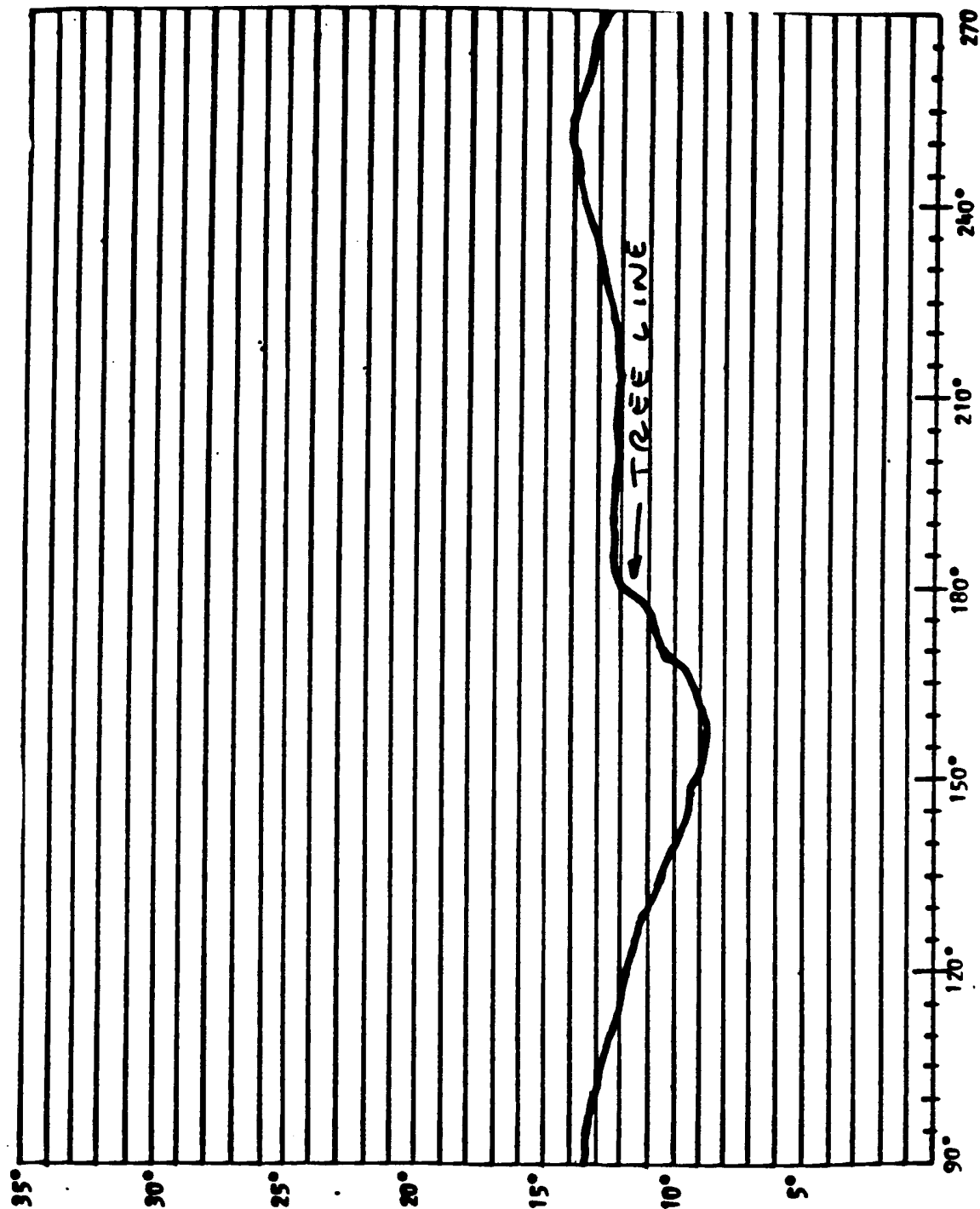


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Plot Plan for Measurement at Water Pump Site  
Figure 3.17-3

SITE REPORT - Washington, D.C.



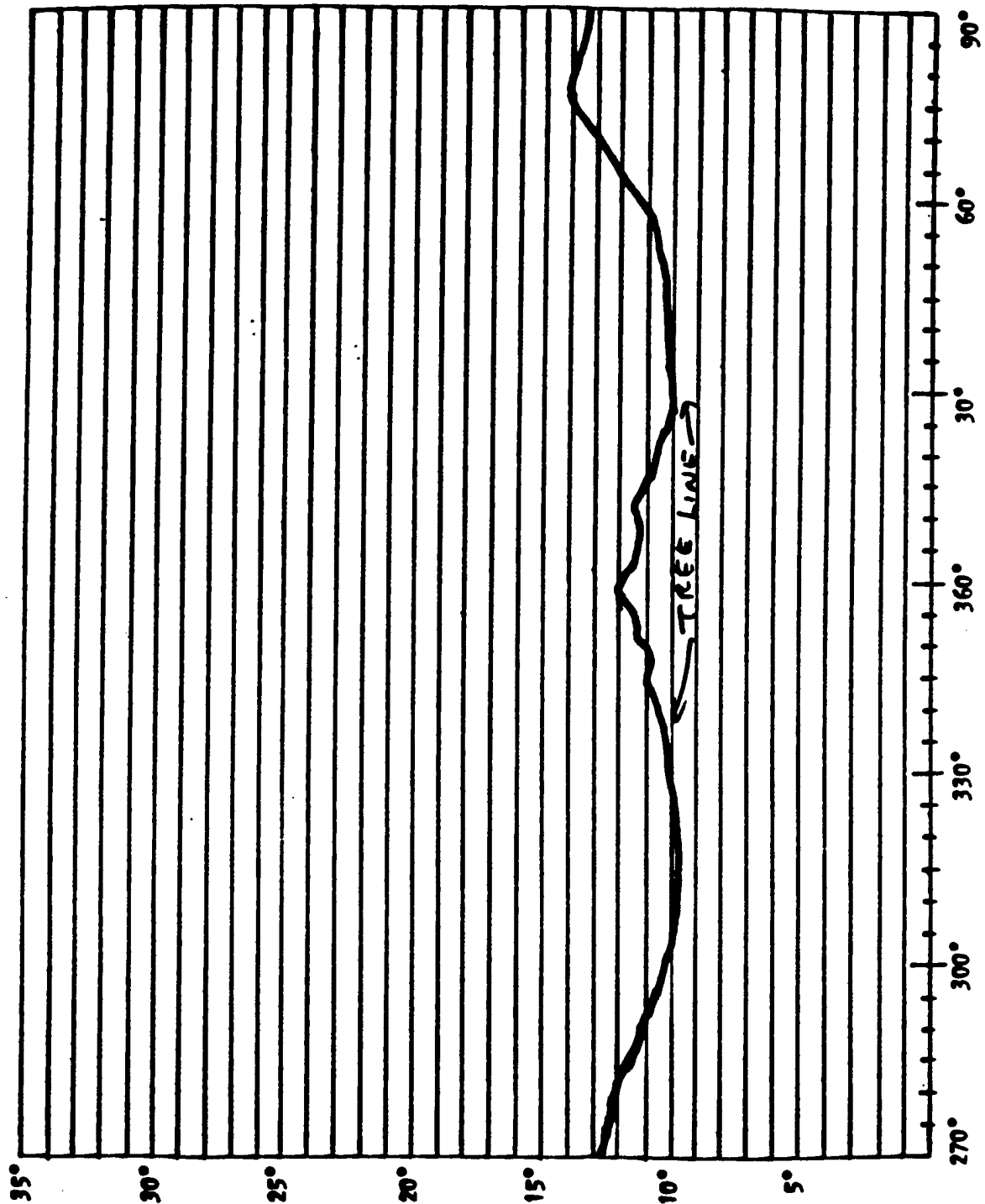
Horizon Profile for Measurement Site at Upper Camp Goettge  
Figure 3.17-4

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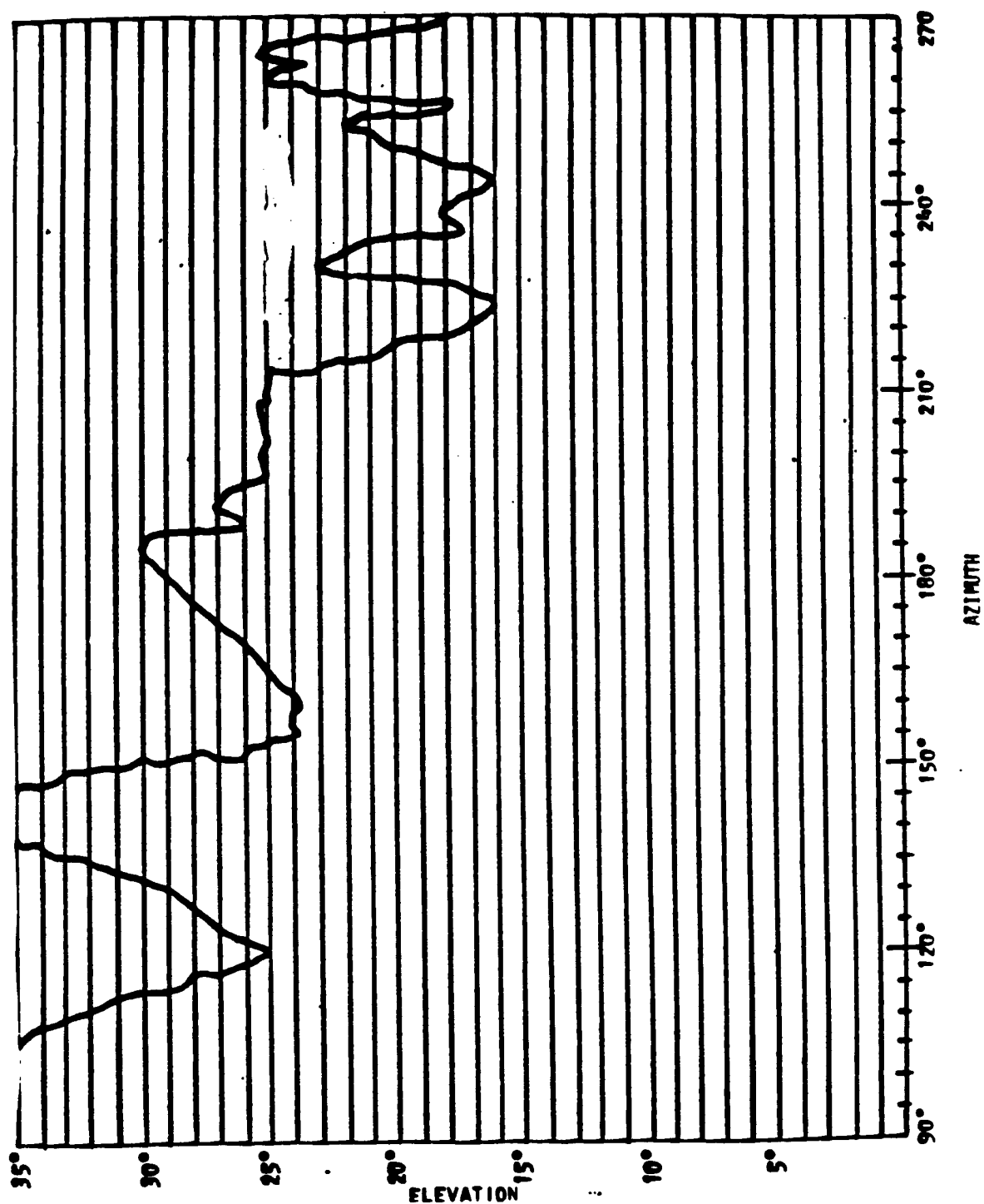
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Horizon Profile for Measurement Site at Upper Camp Goettge  
Figure 3.17-4 (Continued)

SITE REPORT - Washington, D.C.



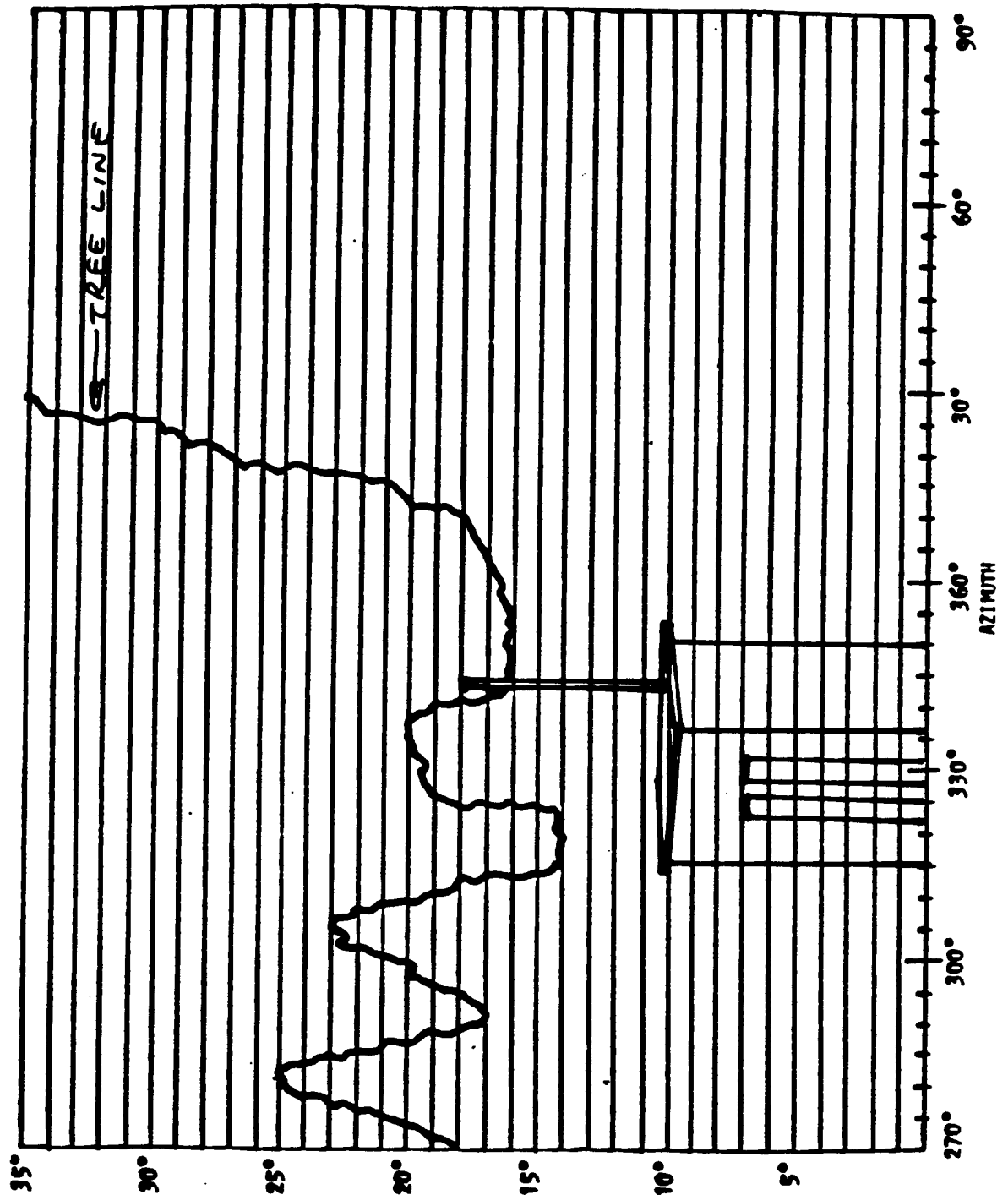
Horizon Profile of Camp Goettge Water Pump Station  
Figure 3.17-5

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Horizon Profile of Camp Goettge Water Pump Station  
Figure 3.17-5 (Continued)

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SITE REPORT - Washington, D.C.**3.17.3 Site RFI Survey (Continued)**

Results of the RFI measurements at the Camp Goettge site are summarized in Tables 3.17-3 and 3.17-4. No 6-GHz signals were detected. These two tables show all the 4-GHz signals detected during the test period with the test antenna at 16 feet and at 27 feet, respectively. For each signal, the maximum level in dBW relative to isotropic which was observed during the test series is recorded, together with the source and azimuth bearing of the test antenna. From this data, it is seen that the interfering 4-GHz signals emanate from three sources: Aldie, Pendleton, and Flint Hill. Aldie signals are received both on a direct path (azimuth 356.4°) and apparently also via a reflected path (azimuth approximately 307°).

The same data is displayed in Table 3.17-5 to facilitate comparison. The global beam of the INTELSAT V satellite operates only in the 3950 to 4200 MHz band. Therefore, only signals in this frequency range are of concern. In this frequency range, it is seen from Table 3.17-5 that the only interfering carriers are those which came from Aldie (direct and reflected paths) and Pendleton. The level of each of these interfering carriers is in the range of -146 to -152 dBW relative to isotropic.

It is also seen from Table 3.17-5 that in the frequency range of interest, increasing the height of the test antenna from 16 to 27 feet resulted in increase of carrier level of 3 dB for the Aldie direct path carrier and 2 dB for the Pendleton carrier while the Aldie reflected carrier level was substantially unaffected (two frequencies were unchanged in level; one frequency changed 1 dB).

In the first-level coordination (Table 3.17-2) it was predicted, on the basis of free space loss only, that the Aldie source would create interference at a level of about -110 dBW relative to isotropic. As shown in Table 3.17-5, the measured level of interference from this

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TABLE 3.17-3  
 SUMMARY OF 4-GHZ RFI  
 MEASURED AT CAMP GOETTGE, VA.  
 TEST ANTENNA AT 16 FEET  
 6 AND 7 JULY 1983

<u>FREQUENCY</u> <u>(MHZ)</u>	<u>AZIMUTH</u> <u>(DEGREES)</u>	<u>MAX. LEVEL</u> <u>RELATIVE TO</u> <u>ISOTR. (DBW)</u>	<u>SOURCE</u>
3730	356.4	-148	Aldie
3730	197	-149	Pendleton
3730	307	-153	Aldie (Ref1)
3750	356.4	-155	Aldie
3770	307	-154	* (Ref1)
3770	300.8	-151	Flint Hill
3810	356.4	-147	Aldie
3810	197	-149	Pendleton
3810	307	-153	Aldie (Ref1)
3830	356.4	-154	Aldie
3850	300.8	-151	Flint Hill
3890	356.4	-152	Aldie
3890	197	-145	Pendleton
3890	307	-152	Aldie (Ref1)
3910	356.4	-151	Aldie
3910	197	-155	Pendleton
3930	300.8	-152	Flint Hill
3970	356.4	-149	Aldie
3970	197	-151	Pendleton
3970	307	-153	Aldie (Ref1)
4030	300.8	-151	Unknown
4050	356.4	-150	Aldie
4050	197	-151	Pendleton
4050	307	-152	Aldie (Ref1)
4130	356.4	-153	Aldie
4130	197	-153	Pendleton
4130	307	-153	Aldie (Ref1)

\*Probably Flint Hill

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TABLE 3.17-4  
 SUMMARY OF 4-GHZ RFI  
 MEASURED AT CAMP GOETTGE, VA.  
 TEST ANTENNA AT 27 FEET  
 6 AND 7 JULY 1983

<u>FREQUENCY</u> <u>(MHZ)</u>	<u>AZIMUTH</u> <u>(DEGREES)</u>	<u>MAX. LEVEL</u> <u>RELATIVE TO</u> <u>ISOTR. (DBW)</u>	<u>SOURCE</u>
3730	356.4	-141	Aldie
3730	197	-147	Pendleton
3730	307	-154	Aldie (Ref1)
3730	300.8	-153	Unknown
3750	356.4	-149	Aldie
3770	307	-154	* (Ref1)
3770	300.8	-149	Flint Hill
3810	356.4	-141	Aldie
3810	197	-149	Pendleton
3810	307	-153	Aldie (Ref1)
3830	356.4	-152	Aldie
3850	300.8	-149	Flint Hill
3890	356.4	-144	Aldie
3890	197	-147	Pendleton
3890	307	-155	Aldie (Ref1)
3890	300.8	-155	Aldie (Ref1)
3910	356.4	-152	Aldie
3930	300.8	-147	Flint Hill
3970	356.4	-146	Aldie
3970	197	-150	Pendleton
3970	307	-154	Aldie (Ref1)
3990	356.4	-155	Aldie
4050	356.4	-148	Aldie
4050	197	-149	Pendleton
4050	307	-152	Aldie (Ref1)
4130	356.4	-147	Aldie
4130	197	-151	Pendleton
4130	307	-153	Aldie (Ref1)

\*Probably Flint Hill



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TABLE 3.17-5  
 COMPARISON OF INTERFERING 4-GHZ CARRIER LEVELS  
 DIFFERENT SOURCES AND TEST ANTENNA HEIGHTS FROM RFI TESTS  
 CAMP GOETTGE, VA.  
 6 AND 7 JULY 1983

FREQ (MHZ)	TEST ANT 16 FEET				TEST ANTENNA 27 FEET			
	ALDIE	ALDIE (REFL)	PENDLETON	FLINT HILL	ALDIE	ALDIE (REFL)	PENDLETON	FLINT HILL
3730	-148	-153	-149		-141	-154	-147	
3750	-155				-149			
3770				-154 -151				-149 -154
3790								
3810	-147	-153	-149		-141	-153	-149	
3830	-154				-152			
3850				-151				-149
3870								
3890	-152	-152	-145		-144	-155	-147	
3910	-151		-155		-152			
3930				-152				-147
3950								
3970	-149	-153	-151		-146	-154	-150	
3990					-155			
4010								
4030								
4050	-150	-152	-151		-148	-152	-149	
4070								
4090								
4110								
4130	-153	-153	-153		-147	-153	-151	
4150								
4170								

Note: All carrier levels in dBW, relative to isotropic.

SITE REPORT - Washington, D.C.**3.17.3 Site RFI Survey (Continued)**

source -146 dBW at the worst frequency and 27 foot antenna height. Thus, it is concluded that natural shielding provides about 36 dB reduction in level of interference from this source.

The following table shows the 4-GHz frequencies and polarizations assigned to Aldie and to Flint Hill as indicated by the COMSEARCH supplied FCC data base. Occupancy of the assigned frequency channels discerned during RFI measurements is shown by an (X) in the table. Where (0) appears, that carrier frequency was not detected during RFI measurements.

<u>Frequency (MHz)</u>	<u>Aldie</u>		<u>Flint Hill</u>	
	<u>Assigned Polarization</u>	<u>Occupied</u>	<u>Assigned Polarization</u>	<u>Occupied</u>
3730	V	X		
3750	H	X		
3770			H	X
3790				
3810	V	X		
3830	H	X		
3850			H	X
3870				
3890	V	X		
3910	H	X		
3930			H	X
3950				
3970	V	X		
3990	H	X		
4010			H	0
4030				
4050	V	X		
4070	H	0		
4090				
4110				
4130	V	X		
4150	H	0		

SITE REPORT - Washington, D.C.

## 3.17-3 Site RFI Survey (Continued)

From this table it is seen that two of the twelve carriers assigned to Aldie, and one of the four carriers assigned to Flint Hill were not in use at the time that RFI measurements were conducted. It must be presumed that these carrier frequency channels may be occupied at any time the traffic load requirements of the common carrier to which the channels are assigned make this desirable to him. Occupancy of these additional channels, however, will not substantially affect the interference level because their level will be about the same as the measured signals.

No 6-GHz signals were detected during the two days of RFI measurements. The following calculations shows that this result is to be expected. Table 3.17-2 indicates that the terrestrial microwave receivers which will receive the highest level interference from the earth station 6-GHz transmitter are located at Aldie (#19) and Bull Run (#92). However, the terrestrial microwave transmitters which transmit to the Aldie and Bull Run receivers are located at Nokesville and Morrisonville, respectively.

Nokesville is 17.8 km from the earth station site at an azimuth bearing of 352.5 degrees, and Aldie is 51.7 km from the earth station at an azimuth bearing of 356.4 degrees. Thus, the Nokesville transmitter, which might have been detected during RFI measurements, is beamed almost due north to Aldie which is about 34 km further north, so that the "back" of the Nokesville microwave antenna is toward the proposed earth station site. Maximum gain of the terrestrial antenna in the back direction is no greater than -10 dBi. Free space loss at 6-GHz for a distance of 17.8 km is approximately 133 dB. The Nokesville transmitter power is 0 dBW. If this transmit power is combined with the antenna gain toward the earth station site and the free space loss subtracted, it is seen that the maximum possible received carrier level will be -143 dBW

SITE REPORT - Washington, D.C.**3.7.3 Site RFI Survey (Continued)**

relative to isotropic. As previously discussed, the 4-GHz measurements showed about 36 dB reduction in interfering carrier levels to be attributable to natural shielding; even greater reduction is to be expected at 6-GHz.

Therefore, the level of the 6-GHz carrier from the Nokesville transmitter received at the earth station site should be -179 dBW or lower which is well below the sensitivity of the 6-GHz test receiver (-156 dBW) used for the RFI measurements.

A similar situation exists for the Morrisonville microwave transmitter which is 19.9 km from the earth station site at an azimuth bearing of 237.2 degrees. This transmitter also is beamed almost due north to Bull Run which is 37.9 km from the earth station at an azimuth bearing of 344.9 degrees.

RFI measurements were also conducted on 6 July 1983 at the Pump Station site which is located roughly a half-mile south of the Camp Goettge site. Results of these measurements are summarized in Table 3.17-6. Only the carriers from Aldie (direct path) were detectable at the Pump Station site; other carrier levels fell below the threshold of the receiving system. On the basis of comparisons of the appropriate entries in Tables 3.17-5 and 3.17-6, it is seen that the Pump Station offers an advantage of from 6 to 10 dB. This advantage is attributable to the lower elevation of the pump station.

The on-site RFI measurements performed at Camp Goettge indicated that 4-GHz interference in the band of interest arrives from three different azimuth directions; 356.7 degrees (Aldie), 307 degrees (Aldie reflected), and 197 degrees (Pendleton). All of these

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TABLE 3.17-6  
4-GHZ INTERFERING CARRIER LEVELS  
ALDIE SOURCE - 16 AND 27 FOOT TEST ANT HEIGHT  
FROM RFI TESTS AT PUMP STATION NEAR CAMP GOETTGE  
6 JULY 1983

<u>FREQUENCY</u> <u>(MHZ)</u>	<u>TEST ANT LEVELS</u> <u>AT 16 FEET RELATIVE</u> <u>TO ISOTROPIC (DBW)</u>	<u>TEST ANT LEVELS</u> <u>AT 27 FEET RELATIVE</u> <u>TO ISOTROPIC (DBW)</u>
3730	-157	-149
3810		-151
3890		-150
3970	-157	-153
4050		-155
4130		-155

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Interfering carriers were measured in the range -146 to -155 dBW, relative to isotropic (Refer to Table 3.17-5).

The Washington earth station will use a 15.5-meter antenna whose center will be about 35 feet above the ground. As shown in Table 3.17-5, increasing the test antenna height from 16 to 27 feet resulted in an increase in the level of interference for the carriers in the upper half of the 4-GHz band of 1 to 5 dB. One carrier increased by 1 dB, three carriers by 2 dB, one carrier by 3 dB, and one by 6 dB. It is estimated that the additional eight-foot height increase to the center of the 12-meter antenna will not increase the level of interference by more than 4 dB.

If its measured interference levels are increased by 4 dB to account for the increased height of the 15.5-meter antenna plus 6 dB for up-fade statistics and the result compared with this criteria, it is concluded that up to 34 dB of additional attenuation is required at the Camp Goettge site. As noted in the previous section, the Pump Station site has a 7 dB shielding advantage, so the required attenuation at the Pump Station site is 7 dB lower than at the upper part of the camp.

**3.17.5 Interference Resolution**

It has been shown in the previous section that additional attenuation is required for interfering carriers arriving from azimuth bearings of approximately 200, 300, and 356 degrees. The amount of attenuation required is about 34 dB at the Camp Goettge site and 27 dB at the Pump Station site.

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Because the frequency plan for the Washington site must accommodate all the carriers to other stations in the network, frequency offsetting is not recommended at this station. Therefore, the required amount of additional attenuation (27 dB at the Pump Station) must be obtained by means of a shielding wall.

Figure 3.17-6 shows the general construction and arrangement of a 30-foot high earth berm with 25-foot tall trees will provide the required attenuation.

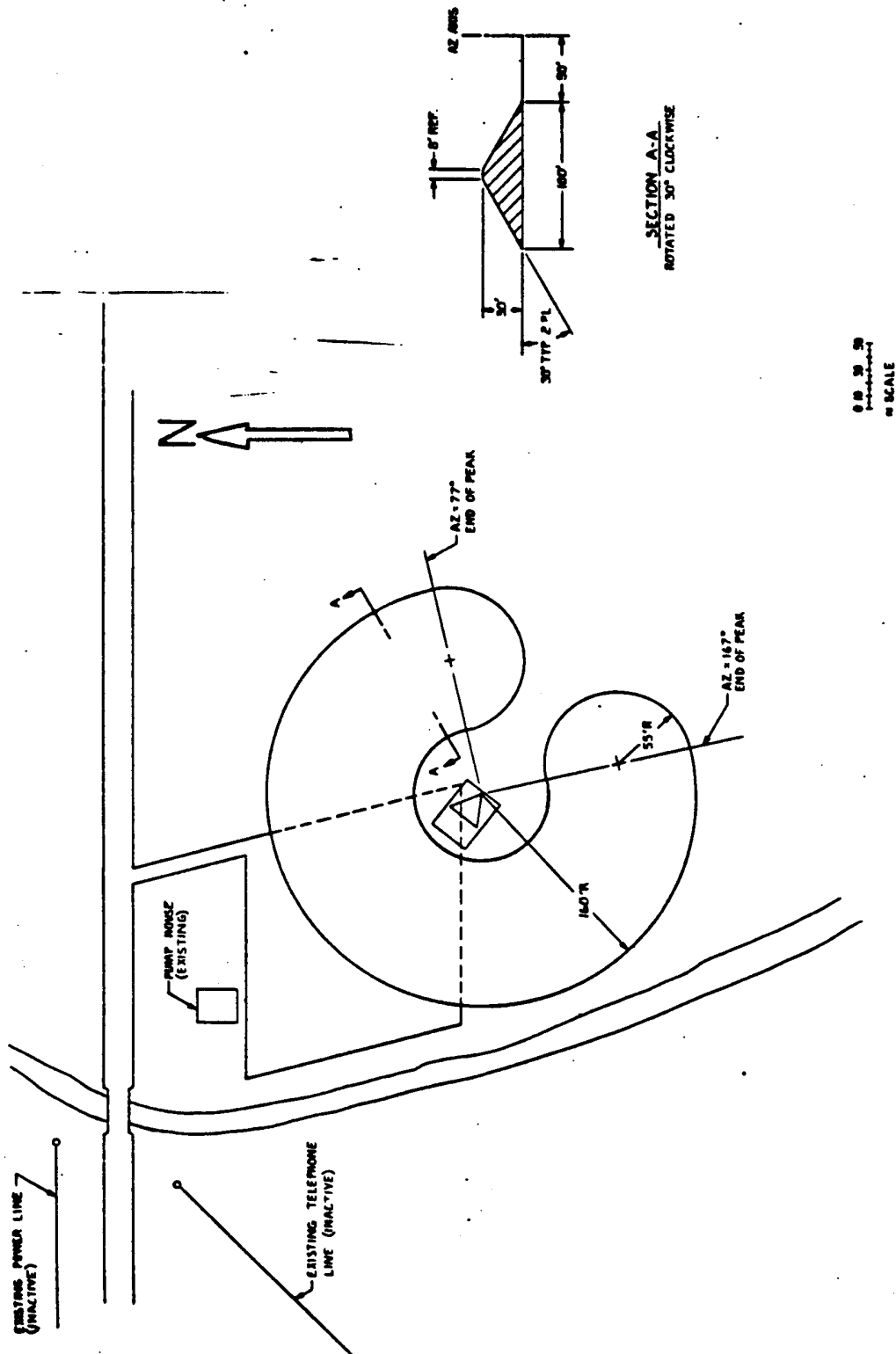
**3.17.6 Station Application Procedures**

Since this site is in the United States, application for license must be made to the Federal Communications Commission (FCC). Since the INTERNET will use the INTELSAT space segment, application must also be made to INTELSAT via COMSAT who is the official U.S. signatory to INTELSAT.

Application documents, then, will include the following:

- A. Completed INTELSAT Application for submission to COMSAT - See Appendix D.
- B. Completed ITU Form of Notice AP3/B "TRANSMITTING EARTH STATION" and Form of Notice AP3/C "RECEIVING EARTH STATION" - See Appendix C.
- C. Completed FCC Application Forms for submittal to FCC. Refer to Appendix K and Figures 3.17-7 and 3.17-8.
- D. A current frequency coordination report for submittal to FCC.

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Shielding Berm for Pump Station Site

Figure 3.17-6

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